



The Impact of the COVID-19 Pandemic on the Private Rental Housing Market in Poland: What Do Experts Say and What Do Actual Data Show?

Mateusz Tomal (corresponding author)

Department of Real Estate and Investment Economics, Cracow University of Economics, Poland
tomalm@uek.krakow.pl

Bartłomiej Marona

Department of Real Estate and Investment Economics, Cracow University of Economics, Poland,
maronab@uek.krakow.pl

Abstract: *The aim of the article is to determine the impact of the COVID-19 pandemic on the level of housing rents using the example of the City of Krakow. This study is based on objective data on rental prices and subjective information obtained from real estate agents using a questionnaire survey. The research revealed that the first wave of the COVID-19 pandemic actually led to a 6-7% decrease in prices in the rental market in Krakow, while at the same time the surveyed real estate agents had estimated that rents would drop by about 13%. With the second wave of the pandemic, it is possible to see that its immediate impact, i.e. between the third and fourth quarter of 2020, has led to a further 6.25% drop in rents. It should be noted that the latter decrease was very accurately predicted, both by the survey respondents and by the econometric models used. Finally, the results of the analysis also indicated that the worsening of the pandemic in the last quarter of 2020 will have a significant impact on rent levels in Krakow for all of next year. Regardless of how the economy develops, rental prices are forecast to fall further in 2021q1. However, in the subsequent quarters of 2021, rents are projected to increase, but ultimately their level will not return to pre-pandemic values even in 2021q4. The latter is likely to happen only in the second half of 2022.*

Keywords: East European housing; private rental markets; housing in developing countries; COVID-19; SARS-CoV-2.



Introduction

Along with the WHO announcing the outbreak of the COVID-19 pandemic in March 2020, various scientific centres around the world began to conduct research in order to obtain a better understanding of how the new coronavirus works, which included making some improvement to diagnostic tests, searching for new drugs and vaccines, but also mitigating the negative social effects of the pandemic. We should remember that COVID-19 pandemic is mainly a humanitarian crisis, but one that has significant socio-economic consequences. In this context research conducted by economists is particularly important. It is largely focused on recognising the effects of the global pandemic on the individual segments of economic life and identifying restructuring programmes that could minimise negative results on both a microeconomic and a macroeconomic scale. It is therefore no surprise that there has also been research going on in the area of the broadly understood real estate market (including the housing market), since not only does the market create jobs in the economy (both the legal and the grey market), but also, by linking the process of building and maintaining housing with other sectors, it has a multiplier effect and considerably contributes to shaping the labour market and to the level of Gross Domestic Product (GDP) in individual economies. Research on the functioning of the housing market in the face of the COVID-19 pandemic includes the work by Maalsen et al. (2020) on the flat rental market, an article by D'Alessandro et al. (2020) on housing architecture, and the research by Nicola et al. (2020) into the processes of selling flats and into changes in real estate financing. There has been very little research dealing directly with the shaping of prices on the housing market (see, for example, Del Giudice et al. 2020; Qian et al. 2021; Wang 2021), which probably has to do with the fact that it is difficult to study the dynamics of the real estate market because the information on transactions becomes available to researchers with considerable delay. This article seeks to at least partially fill this research gap. Its main aim, therefore, is to determine the impact of the COVID-19 pandemic on the level of rents (rental prices) taking the city of Krakow, Poland, as an example. In particular, it will examine how the first and the second wave of the COVID-19 pandemic have affected prices in the market under investigation. It will also offer a long-term forecast of rent levels for the entire year of 2021 assuming four alternative scenarios. The latter will be based on the projection of different levels of the unemployment rate as a fundamental factor that shapes demand in the rental market. Moreover, this study aims to assess to what extent real estate agents in Poland and econometric models are able to forecast changes in the housing market in the face of crisis events.

Lockdowns and their impact on the Polish private rental housing market

In response to the SARS-CoV-2 coronavirus, the Polish government took a number of measures to combat the pandemic. During the first wave of the disease in March 2020, a lockdown was introduced in the country, which led to a significant decline in economic growth and an increase in unemployment. All this affected the functioning of the private rental housing market and, in particular, impacted tenants who, in many cases, lost the ability to pay their rent on time. As a consequence, the government decided to increase legal protection for tenants by: 1) prohibiting the termination of rental agreements and rent increases in the period from 31 March to 30 June and 2) enabling the unilateral extension of a lease agreement by the tenant until 30 June. In addition, an effect of the first wave of the



pandemic was that short-term renting almost ceased to exist (it was legally prohibited between 13 and 20 March 2020), which led many flat owners to change their strategy in the market. In particular, a significant stock of flats were reallocated for use as long-term instead of short-term renting. Considering the above, it can be concluded that both rent levels and the number of transactions on the rental housing market in Poland very likely fell as a result of the first wave of the COVID-19 pandemic.

The outbreak of the second wave of the coronavirus in Poland at the turn of September and October 2020 is likely to cause another price drop in the Polish rental housing market, primarily because of a potential further increase in the unemployment rate in the aftermath of the restrictions imposed since October 2020 (but they were not as far-reaching as during the first wave of the pandemic). The second extremely important element influencing the probable fall in rents as a consequence of the second wave of the pandemic is the fact that most Polish universities have decided to conduct remote learning, and thus a huge pool of potential tenants has vanished from the rental market. In the context of the second wave, the Polish government took further steps to stabilise the rental housing market. In particular, the law passed on 28 October 2020 allows tenants to apply for a rent supplement equal to 75% of the amount of rent they pay if they can prove that their monthly income has decreased by at least 25% as a consequence of the COVID-19 pandemic. This type of action should be assessed positively as it increases the financial stability of both tenants and landlords. However, to a large extent, this regulation will not affect owners of flats whose previous tenants were students. Therefore, the Polish government should take further measures with regard to this group of landlords, especially those for whom rent is the only source of income.

Methodology

Data and study area

This study will use data from the National Bank of Poland (Łaszek and Jakubik 2020) and the AMRON centre (Pilcicka 2020) on quarterly transaction rents. However, it should be emphasised that these data on rents end on 2020q1, which makes it impossible to determine the impact of the COVID-19 pandemic on the private rental market. Therefore, in April (q2), July (q3), and November (q4) 2020 information was collected using a web scraping technique on long-term rental prices on offer obtained from the largest Polish Internet website otodom.pl. In each of the studied periods, data were collected on several thousand rental offers, on which basis an average rental amount was determined. The above procedure was also conducted in February (q1) in order to estimate the relationship between transaction prices and offer prices, which was 0.88. Finally, after the conversion of offer prices from 2020q2-q4 to transaction prices, a database which covered the period of 2013q1-2020q4 was obtained.

A second source of information about the impact of the COVID-19 pandemic on rental prices in Poland was a survey questionnaire that was sent to all real estate agents operating as part of the Association of Real Estate Agents of the Malopolska Region, which amounted to 226 people. Real estate market professionals were asked in the survey first about the percentage change in the level of rent per 1 m² between July 2020 and the level before the pandemic was declared, and also about the predicted further change in rents between the third and fourth quarter this year. Respondents were asked not to correct their responses with possible



seasonal fluctuations. A total of 20 completed surveys were obtained, which is 8.85% of the whole sample.

The research area included the City of Krakow, which is the second largest housing market in Poland. Therefore, the analysis presented here is interesting in the context of not only Polish but also other large European rental housing markets.

Identifying the impact of the first wave

In order to verify to what extent the first wave of the COVID-19 pandemic has affected rent levels in the market under investigation, the actual rate of change of rental prices will be calculated as follows:

$$g_{AFW} = \ln\left(\frac{r_{2020q3}}{r_{2020q1 \text{ or } 2019q4}}\right) \tag{1}$$

where r_{2020q3} ($r_{2020q1 \text{ or } 2019q4}$) denotes the actual average rent per 1 m² in 2020q3 (2020q1 or 2019q4). The purpose of this analysis phase is also to examine the extent to which real estate agents were able to accurately forecast changes in the rental market following the onset of the coronavirus pandemic. In this connection, the rate of change in rental prices declared by the respondents will also be estimated as:

$$g_{RFW} = \frac{1}{R} \sum_{k=1}^R q_k \tag{2}$$

where R is the number of real estate agents surveyed, q_k is the answer given by the k -th respondent to the question ‘at the moment (July 2020), has the COVID-19 pandemic affected rents in the long-term residential rental market in Krakow? If so, please estimate how much the percentage has decreased or increased the rent per 1 m² compared to the situation before the pandemic’. It should also be stressed that the real estate agents were asked not to adjust their forecasts for seasonal effects. In the end, both of the above rates of change (g_{AFW} and g_{RFW}) will be compared to check the accuracy of the predictions made by real estate experts.

Identifying the immediate impact of the second wave

To assess the immediate impact of the second wave of the COVID-19 pandemic on rental prices, the same procedure as that for the first wave will be applied, except that the actual rate of change in rent levels will take the following form:

$$g_{ASW} = \ln\left(\frac{r_{2020q4}}{r_{2020q3}}\right) \tag{3}$$

In turn, the declared rate of change estimated by respondents should be presented as:

$$g_{RSW} = \frac{1}{R} \sum_{k=1}^R z_k \tag{4}$$



where z_k is the answer given by the k -th respondent to the question ‘do you think that the level of rents in Krakow for 1 m² in the 4th quarter of this year compared to the current situation (July 2020) will decrease or increase? Please estimate the percentage change.’ It should also be noted that in the context of the second wave of the pandemic, the real estate agents surveyed were forecasting ahead, rather than assessing existing changes as they were in the first wave. Therefore, it is extremely interesting not only to check how accurate their predictions are but also to compare them with those made on the basis of econometric models. Three different techniques will be used to carry out the latter. The first one is the ARMAX model formulated as follows: ¹

$$y_t = \sum_{i=1}^p \phi_i y_{t-i} + \sigma x_t + \sum_{j=1}^q \theta_j \varepsilon_{t-j} + \varepsilon_t \tag{5}$$

where y_t is the quarterly rate of change in the average rent in period t , ² ϕ_i , θ_j , σ are the model's parameters, ε_t is a random component in period t , p is the order of delays in the autoregressive process, q is the order of delays in the moving-average process, and x_t is an explanatory exogenous variable (EEV) and denotes the quarterly rate of change in the unemployment rate in period t . It should be noted that the importance of the unemployment rate as a fundamental factor influencing prices in the Polish housing market has been confirmed by many studies to date (see, for example, Tomal 2019). Moreover, it is also the only variable that is reported by the Polish Statistical Office on an almost regular basis. In this study two different specifications of the ARMAX model were adopted. The former used the assumed immediate impact of the EEV (x_t) on the dependent variable and the latter its one-time delay (x_{t-1}). In turn, in order to select parameters p and q the AIC criterion was applied. Maximum delays equal to 5 were assumed for both above parameters. On this basis, ARMAX(2,1) was used in the case of the inclusion of x_t and ARMAX(4,2) was selected in the case of the inclusion of x_{t-1} . ³

An additional model used to predict the future values of the dependent variable is OLS regression with AR(1) errors:

$$y_t = \alpha + \beta x_t + \varepsilon_t \text{ with } \varepsilon_t = \gamma \varepsilon_{t-1} + v_t \tag{6}$$

where α is the intercept, ε_t and v_t are the error terms, and β and γ are the model's parameters. The most basic predictive model will also be used:

$$y_t = \pi + \rho x_{t-1} + \varepsilon_t \tag{7}$$

where π denotes the constant term, ε_t is the error term, and ρ is the model's parameter. It is also important to note that forecasting for 2020q4 using the ARMAX model, taking into account the current values of the exogenous variable and based on the OLS regression with

¹ The seasonal model was not used because the appropriate tests indicated a lack of stable seasonality among the data on average rents. The findings from the above tests can be made available upon request. However, there is a clear seasonal correlation for the x_t variable. However, in this case the decision was made not to adjust these data seasonally because this procedure changes the time characteristics of the variables (Ghysels and Perron 1993), which may lead to incorrect conclusions, especially in the case of sudden changes caused by the COVID-19 pandemic.

² The ADF test shows that the dependent and explanatory exogenous variables are stationary.

³ The models were positively verified in the context of the lack of an ARCH effect and the lack of the autocorrelation of residuals. The results of the above tests can be made available upon request.



AR(1) errors requires knowledge of the x_t for that date. For this purpose, four possible scenarios of unemployment rate behaviour were assumed: very optimistic, optimistic, realistic, and pessimistic. The first scenario assumed no change in the unemployment rate in 2020q4 compared to the previous quarter; the second assumed an increase of 0.37 percentage points (an average increase over the previous two quarters); the third assumed an increase of 0.73; and the fourth assumed an increase of 1.10. Then, based on the defined unemployment rates, their quarterly change rates were calculated.

Identifying the long-term impact of the second wave

The last objective of the study is to forecast prices on the Krakow rental housing market for the whole of 2021.⁴ For this purpose, the models presented in the previous section will be used, but only the ones that best predicted the drop in rental prices for 2020q4. Moreover, in order to forecast rents, it is also necessary to know future unemployment rates. Therefore, the same values as in the previous section's scenarios will be adopted for 2020q4. However, for the period 2021q1-2021q4, for each scenario the unemployment rates were estimated based on the dynamics of change in the unemployment rate for Poland projected by the OECD after the second wave of the coronavirus (OECD 2020).⁵

Results and discussion

Impact of the first wave

In the first stage of the research the actual change in the rental housing prices in Krakow resulting from the first wave of the COVID-19 pandemic was estimated, and the responses from real estate agents on this matter were analysed. The research findings are presented in Table 1, according to which respondents assessed on average that the SARS-CoV-2 coronavirus had reduced rents in Krakow by about 13%. However, it should be noted that there are no significant differences in the responses between women and men or between more and less experienced estate agents. On the other hand, based on the collected databases, the actual drop in prices on the Krakow private rental housing market was equal to about 6-7%, i.e. from about PLN 44 to PLN 41.15 per 1 m². Therefore, we can claim that, despite very pessimistic forecasts, the COVID-19 pandemic has not brought about big changes in prices on the rental market. The limited impact of the SARS-CoV-2 coronavirus on prices in the housing market has also been demonstrated by Del Giudice et al. (2020), who analysed the Italian real estate market.

Consideration should also be given as to why the real estate experts who were surveyed more than doubly overestimated the impact of the pandemic on rents. There could be two reasons for this. First, it could be because of the general atmosphere of fear evoked by the latest

⁴ It should be noted that in the Polish perspective, in the rental housing market a long term means one year or more. In other countries, such as Germany, on the other hand, a 'long-term' analysis covers several or even a dozen years.

⁵ The unemployment rate in Krakow in 2020q3 was 2.73% and increased by 0.73 percentage points from 2020q1 completely reversing the seasonal trend. Forecasts for the period 2020q4-2021q4 for individual scenarios are as follows: 1) Very optimistic: 2.73%, 2.68%, 2.37%, 2.15%, 1.94%; 2) Optimistic: 3.10%, 3.04%, 2.69%, 2.45%, 2.20%; 3) Neutral: 3.46%, 3.40%, 3.01%, 2.73%, 2.46%; 4) Pessimistic: 4.57%, 4.48%, 3.97%, 3.60%, 3.24%.



pandemic and amplified by the introduction of a national lockdown. The second reason could be that the experts who participated in our survey had quite a lot of professional experience (at least 5 years of working actively in the rental market); therefore, when responding to the survey questions they might have relied entirely on their own knowledge and experience, without making any numerical analyses. In behavioural economics the above effect is called the heuristic of overconfidence (Tomal 2019) and it could significantly increase the estimation error by respondents.

Table 1: The impact of the first wave of the COVID-19 pandemic on housing rents in Krakow – real estate agents' estimates versus actual data

Real Estate Agents – all	Real Estate Agents – only women	Real Estate Agents – only men	Real Estate Agents – with over 10 years of experience	Real Estate Agents – with less than 10 years of experience	Actual change (between 2020q1 and 2020q3)	Actual change (between 2019q4 and 2020q3)
-13.25%*	-12.22%*	-14.09%*	-12.86%*	-14.17%*	-6.06%	-7.39%

Source: authors' study. * The average value from collected responses.

The immediate impact of the second wave

The next stage of the study examined how prices on the rental market reacted to the second wave of the COVID-19 pandemic. An analysis of several thousand data obtained from otodom.pl revealed that residential rents in the middle of 2020q4, compared to the previous quarter, had decreased by 6.25% to PLN 38.66 per 1 m². Another decrease in the level of prices in the rental housing market resulted from the recurring introduction of restrictions, which caused significant fluctuations in the labour market after the second wave of the pandemic. In contrast to the price drop in the first wave, the drop in prices at the end of 2020 was also driven by the continuation of remote learning among a large proportion of students, who largely determine the demand for rental flats in Krakow.

The analysis then proceeded to check the accuracy of the forecasted price changes in Krakow's residential rental market that were made by the surveyed real estate agents and by the econometric models. Based on Table 2 we can conclude that the respondents were mistaken by only 1.25 percentage points in their forecasts. However, it is possible that such an accurate prognosis could have been partly accidental. It should be noted that the housing market in Krakow was not impacted by the first wave of the pandemic as severely as experts projected (see Table 1). On the other hand, during the period of their survey, in July 2020, they may have assumed that the pandemic had weakened given the decreased number of cases. All this could have prompted them to be more cautious about future price falls, which paradoxically increased their accuracy. However, the econometric models performed better at estimating than the agents did, especially the ARMAX model with a lagged explanatory exogenous variable, which predicted the fall in prices almost perfectly.



Table 2: Econometric models and real estate agents' predictions versus actual change in rent levels between 2020q3 and 2020q4 (the second wave)

Scenarios	ARMAX with EEV	OLS with AR(1) errors	ARMAX with lagged EEV	Predictive regression	Real estate agents	Actual change
Very optimistic	-0.05%	1.25%				
Optimistic	-2.78%	-0.36%	-6.44%	-2.31%	-5.00%*	-6.25%
Neutral	-5.18%	-2.41%				
Pessimistic	-11.11%	-7.47%				

Source: authors' study. * The average value from the collected responses.

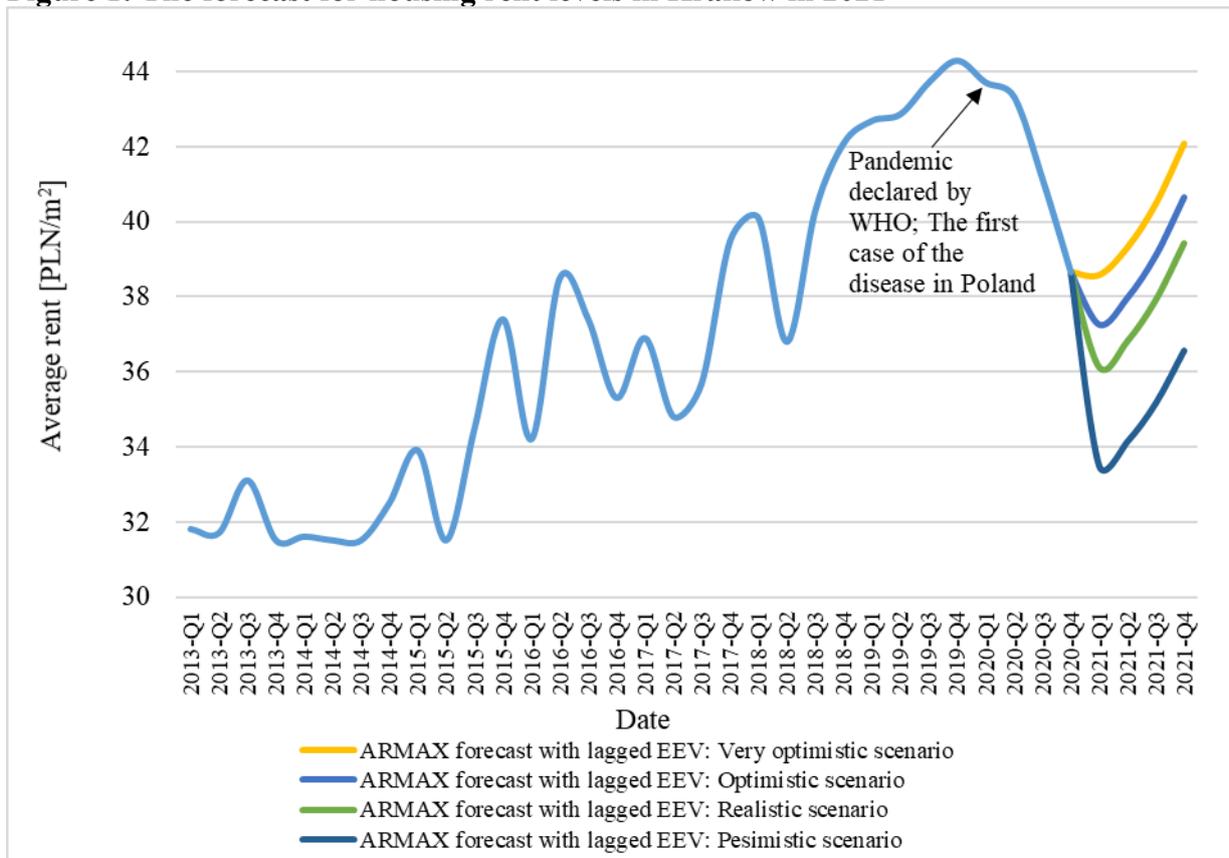
Identifying the long-term impact of the second wave: forecasting rental prices for 2021

In the final stage of the analysis, we attempted to forecast rental prices in Krakow for 2021 using the ARMAX model with a lagged explanatory exogenous variable, which performed best in forecasting residential rent levels in the surveyed city for 2020q4. This model was estimated for each of the four scenarios of change in the unemployment rate, defined in the methodological section, and it also reflected the different possible paths of development of the second wave of the pandemic. The results are presented in Figure 1, and we can conclude from them that rental prices in the residential market in the first quarter of 2021 will fall again to between PLN 33.50 and 38.56 per 1 m² depending on the given scenario. In the quarters that follow it is estimated that rental prices will start to rise, mainly due to the decreasing unemployment rate, but even the most optimistic assumptions indicate that by the end of 2021 they will not have come close to reaching the pre-pandemic level. The latter is only likely to happen in the second half of 2022. ⁶

⁶ Prediction based on estimated rental prices for the 2021q1-2021q4 period and then a matching trend line for them.



Figure 1: The forecast for housing rent levels in Krakow in 2021



Source: authors' study.

Conclusion

Recognising the effects of the pandemic so far and predicting the further consequences it holds for individual segments of socio-economic life is essential in order to propose efficient instruments of public intervention. This general conclusion also concerns the housing market, as without a careful analysis of the consequences of COVID-19 it will not be possible to design proper housing policy tools (Kholodilin 2020). The analysis presented in this article is one of the first in the world to examine the impact of the COVID-19 pandemic on prices in the housing market.

Based on the research that was carried out, some interesting conclusions can be drawn. First, as a result of both the first and the second wave of the COVID-19 pandemic, there has been a significant decrease in prices in Krakow's rental housing market, but the decline has not been drastic. As a result of this first wave housing rents fell by about 6-7%. With the second wave of the pandemic, it is possible to observe that its immediate impact, i.e. between the third and the fourth quarter of 2020, led to further 6.25% drop in rental prices. In a long-term perspective the analysis indicates that the second wave will contribute to a further fall in rental prices in Krakow in the first quarter of 2021, regardless of which of the assumed scenarios of change in the unemployment rate occurs. In subsequent quarters of 2021 prices are projected to increase, but ultimately they will not return to pre-pandemic levels even in 2021q4. The latter is likely to happen only in the second half of 2022.



Like any research, this study has some limitations, which include, among other things, a lack of up-to-date data on rents, which forced the authors to obtain information about offer prices by means of Web scraping, and then converting the information into transaction rents. The latter could be a source of erroneous estimations of the actual price level on the rented market. Therefore, in the future it will be necessary to continue the research undertaken in this article and in particular to re-verify the estimated changes in prices in the rental housing market as a result of the COVID-19 pandemic.

Funding

The publication is financed by a subsidy granted to the Cracow University of Economics.



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